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An Inaugural Dissertation against the Vitality of the blood

By James Kello of Virginia

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Inaugural Dissertation

The subject of the vitality of the blood has the honor of great antiquity. We learn that the celebrated Jewish lawgiver, Moses, held in opinion that the blood was vital: and since his time it has been received and sanctioned by many great men as Aristotle, Plato, Plutarch Harvey and John Hunter. But neither the antiquity of the opinion, nor these great authorities, ought to make us indolently receive it as truth, or ought to shade it in the least from our investigation

As Mr Hunters opinions and experiments are the foundation of nearly all those on the subject at present, we shall proceed to examine some of them & see how far they are entitled to our belief or founded in truth.

He says "he cannot see how it is possible that we should think the blood is otherwise than alive, when we consider that every part is formed from the blood, and that we grow out of it." But to me it appears not more difficult to conceive, that living solids should be formed from dead blood, than that living blood should be formed from food destitute of all life.

Mr Hunter made an experiment with a view to determine whether recent or coagulated blood would retain heat longest, and from his experiments he concluded that the recent would retain it longest, and hence he decided that the "heat retaining" power of the recent blood was a proof of its vitality.

But doubting whether it was a fact that recent blood would retain heat longer than coagulated, to satisfy myself, I made the following experiments, which being repeated

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again and again, and the result being always the same, I must conclude that they are correct altho in opposition to Mr Hunters.

Into two ounces of blood as soon as it flowed from the vein of a healthy person, I introduced a Thermometer which rose to 92°, And in another vessel I had the same portion of coagulated blood heated to the same degree:

The Thermometer in recent blood stood at.....	92	The Thermometer in the coagulalated blood heated to 92°	
In 2 minutes it fell to	90	In 2 minutes it fell to	90
In 4 D°..... D°.....	88	In 4 D°.. D°...	88
6½ D°... D°..	86	6½ D°... D°..	86
8 D°.... D°..	85	8 D°.... D°.	85
10 D°.... D°..	84	10 D°..... D°.	84
13.. D° ... D°.	82	13 D°.... D°.	82
16 D°..... D°	80	16 D°.. D°.	80
19 D°.... D°	79	19 D°.. D°.	79

The temperature of the room was 62° when the experiment was made

I repeated this experiment, with a little variation only, in the manner of making it. The result was the same.

In a bason fill'd with ice, I placed a cup con=taining four ounces of blood, just drawn from the arm of a healthy person.

The Thermom. in fresh blood stood		The Thermometer in coagulated	
at	84°	blood heated stood at	84°
In 3 minutes it fell to	78	In 3 minutes it fell to	78
In 6 D° . . . D° . .	72	In 6 D° . . . D° . .	71
9 D° . . . D° . .	66	9 D° . . . D° . .	66
12 D° . . . . D° . .	63	12 D° . . . . D° . .	63
14 D° . . . D° . .	60	14 D° . . . D° . .	60
18 D° . . . D° . .	56	18 D° . . . D° . .	57
22 D° . . . D° . .	53	22 D° . . . D° . .	54
25 D° . . . . . D° . .	51	25 D° . . . . D° . .	52

These experiments, I trust, were made with accuracy, and from their result, we must conclude, that this "heat retaining" power is not possessed by the blood when taken out of the body, but

that it loses its heat in the same proportion as the coagulated blood: But even in the lung it does not possess this power, for we find that in the short time it takes to circulate, it loses several degrees of its heat. In the lungs, where it receives its heat it is about 96° or 98° but in the superficial veins it is not more than 92°, hence in the course of 4 or 5 minutes the time it takes to perform its circulation its parts with 4 or 5 degrees of heat.

Mr Hunter himself acknowledges that his experiment, on this subject, was not accurately made, for, says he, "The two bloods should have been at the same temperature." Whereas he heat the coagulated blood heated to 98° while the recent blood was only 96°. The coagulated blood being the hottest would of course part with its heat faster to any "neighbouring colder body, for we know the warmer

any body is, the faster it will part with its heat to any colder body.

We shall now proceed to consider Mr Hunter's ~~next~~ argument, which is founded upon a supposed similarity, in the coagulation of blood and ~~the~~ the contraction of muscle. But for my part I conceive the two contractions are widely dissimilar. When a muscle is stimulated to contract, it again returns to its state of relaxation if the stimulus be removed; But it is not so with the blood; for when once contracted, like other elastic, inanimate bodies, it remains so. With equal propriety we might say there is a similarity between the coagulation of Milk and the contraction of muscles, for milk will coagulate and contract so much as to leave the sides of the vessel and form a cup like appearance and squeeze out the serum just in the same man-

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that blood does and the coagulation is also hastened by many stimulants, as electricity &c as is that of the blood, yet no body would argue from hence that milk is alive. "And as the contraction in coagulation is the only particular effect instanced as produced by the stimulating influence on the blood, and as this effect would not be admitted as proof of vitality in any other fluid whatever, it cannot as far as I am able to discover be made use of in illustration of the point in question."

We come now to consider the argument in which Mr Hunter seems to place most confidence for the support of his doctrine, that is, that extravasated blood is the bond of union between divided parts and that it has the power within itself of forming vessels, nerves.

The only proof which Mr Hunter

had, that the coagulum forms vessels, was an experiment made by himself. He says "By injecting the crural artery of a stump, above the knee, where there was a small piramidal coagulum, I have filled this coagulum with my injection, as if it had been cellular; but there was no regular structure of vessels." But Mr Hunter himself does not seem to place much confidence in this experiment, and we doubt if it proves any thing, it proves ~~that~~ that in this instance, at least, the coagulum did not form vessels; as Mr H says, he could not discover any regular structure of vessels.

Then as there is no experimental proof that the coagulum forms vessels, nerves &c; this opinion must be founded on mere hypothesis.

Although Mr Hunter in his work on the blood gun shot wounds &c seems generally to think that coagulated blood, has the

power

power of forming vessels, and uniting divided parts, yet in one place he says, that this may be brought about by the inosculation of the divided vessels. In a note to page 1 of his work on the blood &c. he says, "In many inflammations of the eye we find an artery or arteries passing from the tunica conjunctiva to the cornea, and ramifying on that part. These have been cut across to prevent the influx of the blood; the two ends are seen to shrink, but in a little time they are again perceived to unite, and the circulation to be carried on as before". Now if we see this the case in one instance, why not suppose it is the case in every instance, that is not visible to the eye, or why search out a new method which is entirely hypothetical.

Coagulated blood, it is probable, by its glutinous texture, may be calculated

to favor and promote the reunion of divided parts but that it has the power within itself of forming vessels, nerves &c is, we think, very improbable. In the healing of wounds in which we can see the process go on, the vessels throw out granulations, and these unite to the surrounding parts, and the coagulated blood, if there be any, is reabserbed; and why not suppose the same process to go on in the restoration of parts which are not visible to the eye; why invent a new mode of bringing about reunion, and this founded on mere hypothesis, when we see that parts can be readily reunited in another way.

We have thus briefly considered the arguments in favor of the vitality of the blood, and in as concise a manner as possible have endeavoured to shew that none of them are sufficient to support such an

opinion

opinion; How far we have succeeded we must leave to the candid and unprejudiced reader to decide. We do not deem it necessary to offer any apology, for opposing an opinion, which is taught us by some of the professors, The liberal indulgence of free investigation, in this university, is so remarkable as to render this unnecessary. Thus we shall take leave of this subject, but before I finish this essay, my duty impels me, to return my thanks, to each of the professors, for their zeal in giving instruction and in promoting the science of medecine. I have only to regret that it is not, more publickly, in my power, to acknowledge, the inestimable advantage of attending the lectures of the "illustrious professors," of this University.

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